210353

Appendix C

Cost analysis report for vessel, facility, and port security

December 20, 2002
Standards Evaluation and Analysis Division
U.S. Coast Guard Headquarters
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Acronyms

AOR	Area of Responsibility
BLS	U.S. Department of Labor Bureau of Labor Statistics
CCTV	Closed Circuit Television
CFR	Code of Federal Regulations
COTP	Captain of the Port
CSO	Company Security Officer
DOT	U.S. Department of Transportation
FSA	Facility Security Assessment
FSO	Facility Security Officer
FSP	Facility Security Plan
GT	Gross Tons
IMO	International Maritime Organization
ISPS Code	International Code for the Security of Ships and of Port Facilities
ITB	Integrated Tug-Barge
MARAD	U.S. Maritime Administration
MARSEC	Maritime Security Level
MODU	Mobile Offshore Drilling Unit
MSMS	Marine Safety Management System
NAICS	North American Industry Classification System
NVIC	Navigation and Vessel Inspection Circular
O&M	Operation and Maintenance
OSV	Offshore Supply Vessel
PFSA	Port Facility Security Assessment
PFSC	Port Facility Security Committee
PFSP	Port Facility Security Plan
PFSO	Port Facility Security Officer
PSA	Port Security Assessment
PSC	Port Security Committee
PSP	Port Security Plan
PV	Present Value
SBA	Small Business Administration
SOLAS	Convention for the Safety of Life at Sea
VSA	Vessel Security Assessment
VSP	Vessel Security Plan

Contents

Tables

Executive summary

Note: for definition of acronyms, refer to the list at the beginning of the report.

The United States has been a participant in negotiations at IMO developing the ISPS Code. This analysis presents the scope and magnitude of costs that the maritime transportation industry could incur for implementing and complying with the ISPS Code, parts A and B, and Coast Guard issued NVICs (4-02, 9-02, 10-02). The purpose of this report is to present the broad set of assumptions that we used to develop our cost estimates, document our analysis, and make that information available to the public for comment.

For the purposes of good business practice or regulations promulgated by other Federal and State agencies, many companies have spent, to date, a substantial amount of money and resources to upgrade and improve security. The costs shown in this analysis do not include resources these companies have already spent to enhance security.

We realize that every company engaged in maritime commerce would not implement the ISPS Code exactly as presented in this analysis. Depending on each company's choices, some companies could spend much less than what is estimated herein while others could spend significantly more. In general, we assume that each company would implement the ISPS Code based on the type of vessels or facilities it owns or operates and whether it engages in international or domestic trade.

The ISPS Code provides requirements for "Port Facilities." Because the Coast Guard differentiates between ports and facilities in domestic regulations, however, we are presenting this cost analysis in three sections: vessel security, facility security, and port security. As a result, for the purposes of this cost analysis, the terms PFSC, PFSO, PFSA, and PFSP have been replaced with PSC and PSP for the port security section and FSO, FSA, and FSP for the facility security section.

This analysis presents the estimated cost if vessels, facilities, and ports are operating at MARSEC 1 (the current level of operations since the events of September 11, 2001). We do not estimate costs for MARSEC 2 or 3 because the nature of a threat will determine the cost of responding to that threat. Depending on circumstances, one port, a U.S. coast, or the entire country could have an elevated MARSEC level. The costs for this vast range of threat levels are difficult to estimate with any accuracy. Under MARSEC 2 and 3, we would expect not just the immediate effects of increasing security with more personnel and more screening, but also "ripple" effects—delayed commerce, decreased product availability, price increases, increased unemployment, unstable markets worldwide, even negative psychological effects of threats. The recent shut-down of the West Coast ports, while not in response to a security threat, present a good example of the economic costs that we could experience under increased MARSEC levels.

We do not anticipate that implementing the ISPS Code will require additional manning aboard vessels; the duties envisioned can be assumed by existing personnel. For facilities, we anticipate additional personnel in the form of security guards that can be hired through contracting with a private firm specializing in security.

Based on this analysis, the first-year cost of implementing the ISPS Code for vessels, facilities, and ports is approximately $1.3 billion, with costs of approximately PV $6.0 billion over the next 10 years (2003–2012, 7 percent discount rate). Estimated costs are as follows.

- **Vessel Security**—The first-year cost of purchasing equipment, hiring security officers, and preparing paperwork is approximately $188 million. Following initial implementation, the annual cost is approximately $144 million. Over the next 10 years, the cost would be PV $1.1 billion approximately. The paperwork burden associated with planning would be approximately 140,000 hours in the first year and 7,000 hours in subsequent years.
- **Facility Security**—The first-year cost of purchasing equipment, hiring security officers, and preparing paperwork is an estimated $963 million. Following initial implementation, the annual cost is

approximately $535 million. Over the next 10 years, the cost would be PV $4.4 billion approximately. The paperwork burden associated with planning would be approximately 465,000 hours in the first year and 17,000 hours in subsequent years.

- **Port Security**—The first-year cost is approximately $120 million. The second-year cost is approximately $106 million. In subsequent years, the annual cost is approximately $46 million. Over the next 10 years, the cost would be PV $477 million approximately. The paperwork burden associated with planning would be approximately 1,090,000 hours in 2003, 1,278,000 hours in 2004, and 827,000 hours in subsequent years.

Vessel security

Summary

Note: for definition of acronyms throughout this analysis, refer to the list at the beginning of the report.

Implementing the ISPS Code and NVICs could affect about 10,625 vessels.

The estimated cost of complying with the ISPS Code, parts A and B, and NVICs is PV $1.129 billion (2003–2012, 7 percent discount rate). Approximately PV $257 million of this total is attributable to U.S.-flagged SOLAS vessels. The remaining PV $871 million is attributable to domestic vessels (non-SOLAS) that are affected. In the first year of compliance, the cost of purchasing equipment, hiring security officers, and preparing paperwork is an estimated $188 million (non-discounted, $42 million for the U.S.-flagged SOLAS fleet, $146 million for the domestic fleet). Following initial implementation, the annual cost of compliance is an estimated $144 million (non-discounted, $33 million for the U.S.-flagged SOLAS fleet, $111 million for the domestic fleet).

For the U.S.-flagged SOLAS fleet, approximately 60 percent of the initial cost is for hiring CSOs and training, 24 percent is for vessel equipment, 7 percent is for assigning VSOs to ships, and 9 percent is associated with paperwork (VSAs, VSPs). Following the first year, approximately 79 percent of the cost is for CSOs and training, 3 percent is for vessel equipment, 6 percent is for drilling, 9 percent is for VSOs, and 3 percent is associated with paperwork. CSOs and training are the primary cost driver for U.S.-flagged SOLAS vessels.

For the domestic fleet, approximately 61 percent of the initial cost is for hiring CSOs and training, 25 percent is for vessel equipment, 8 percent is for assigning VSOs to ships, and 6 percent is associated with paperwork (VSAs, VSPs). Following the first year, approximately 82 percent of the cost is for CSOs and training, 1 percent is for vessel equipment, 6 percent is for drilling, 10 percent is for VSOs, and 1 percent is associated with paperwork. As with SOLAS vessels, CSOs are the primary cost driver for the domestic fleet.

We estimate approximately 140,000 burden hours for paperwork during the first year of compliance (36,000 hours for U.S.-flagged SOLAS, 104,000 hours for the domestic fleet). We estimate approximately 7,000 burden hours annually following full implementation of the ISPS Code and NVICs (1,000 hours for U.S.-flagged SOLAS, 6,000 hours for the domestic fleet).

We assume shipping companies would apply the ISPS Code and NVICs differently based on the types of ships they own or operate and whether they operate internationally or domestically. Because an unacceptable amount of detail would be lost if we developed an "average" ship or an "average" company, this analysis calculates cost per affected vessel as well as cost per affected company to capture characteristics unique to these entities.

Analysis

Period of analysis

The period of analysis is 2003–2012 (10 years). Companies must come into compliance with the ISPS Code in 2004, but we assume that companies will purchase equipment and develop security plans prior to the effective date. We assume, therefore, that initial costs will be incurred in 2003, and annual costs will be incurred each year 2004–2012.

Population affected

The population of affected vessels is derived from the Coast Guard's MSMS database and DOT's National Ferry Database. The U.S.-flagged SOLAS population affected is presented in Table 1. As shown, most of the U.S.-flagged SOLAS fleet are freight ships, tank ships, small passenger vessels, or OSVs. Approximately 170 companies own/operate these vessels.

Table 1. Estimated U.S.-Flagged SOLAS population[1, 2, 3, 4]

Vessel	Count	Percent[5]
Freight ship	241	37.6%
Freight barge	2	0.3%
Tank ship	114	17.8%
Tank barge	14	2.2%
Towboat	14	2.2%
Fishing	39	6.1%
Cruise vessel	2	0.3%
Other passenger vessel	109	17.0%
MODU	2	0.3%
OSV	75	11.7%
Oil recovery	1	0.2%
Research vessel	8	1.2%
Industrial vessel	20	3.1%
Total	**641**	**100.0%**

[1] All vessels engaged on international voyages (no GT threshold). There are 96 vessels < 100 GT; there are 112 < 300 GT.

[2] There are 89 freight ships, 19 tanks ships, 1 MODU, and 1 research vessel owned by MARAD.

[3] There are 15 ITBs. They are included in the tank ship population.

[4] There is 1 recreational vessel that is not included in these estimates.

[5] Sum may not add to total due to independent rounding.

The domestic population (non-SOLAS) affected is presented in Table 2. As shown, most of the domestic fleet are tank barges, towboats, or OSVs. Approximately 1,950 companies own/operate these vessels.

Table 2. Estimated domestic population

Vessel	Count	Percent[1]
Freight ship	99	1.0%
Freight barge	262	2.6%
Tank ship	34	0.3%
Tank barge	2,891	29.0%
Towboat > 6 meters[2]	4,645	46.5%
Passenger, ≤ 100 GT, not ferry	223	2.2%
Passenger, ≤ 100 GT, ferry, > 500 passengers	43	0.4%
Passenger, ≤ 100 GT, ferry, ≤ 500 passengers	435	4.4%
Passenger, > 100 GT, cruise	2	0.0%
Passenger, > 100 GT, not ferry	67	0.7%
Passenger, > 100 GT, ferry, > 500 passengers	49	0.5%
Passenger, > 100 GT, ferry, ≤ 500 passengers	92	0.9%
MODU	159	1.6%
OSV	983	9.9%
Total	**9,984**	**100.0%**

[1] Sum may not add to total due to independent rounding.

[2] Towboats over 50 GT. This is a good proxy for towboats > 6 meters.

Unit cost assumptions

Equipment

Costs of equipment are based on extensive research and analysis of several studies that addressed security needs. We estimate annual O&M cost for equipment is 5 percent of the purchase price. Not all vessels would install each piece of equipment. Unit costs of equipment are presented in Table 3.

Table 3. Unit cost of equipment

Equipment	Initial	Annual
Hand-held metal detector	$200	$10
Hand-held radio	200	10
Lock	300	15
Light	400	20
Camera	475	24
Auto-intrusion alarm	500	25
Ship security system (SOLAS only)	2,000	100
Archway metal detector	5,500	275
Portable vapor detector	8,000	400
X-ray baggage machine	39,000	1,950

Personnel, training, drilling, and planning

Costs of personnel and training are based on extensive research and previous Coast Guard analyses that estimated training and planning costs. Personnel and training costs will be incurred each year of the analysis. Drilling costs will be incurred annually, but not initially. Planning costs will be incurred initially and annually, with more costs incurred initially as companies develop their security plans.

We assume costs will vary based on the types of vessels companies own. Companies differ by size and whether or not they are "towing" companies. For the purpose of this analysis, we assume that a large company owns more than 10 vessels (excluding towboats and barges). A small company owns 10 or fewer vessels (excluding towboats and barges).[1] A "towing" company owns only towboats and barges. A "non-towing" company is any other company (it owns only non-towing vessels or it owns a combination of towboats and non-towing vessels).

We assume that large companies will have a dedicated CSO. Small companies will have a part-time CSO (we estimate 0.25 of a dedicated person). CSOs and key crew will have some form of training annually as refresher courses and to address potential employee turnover within a company. The ISPS Code also requires all CSOs to participate in an annual security exercise; for the purposes of this analysis, these costs have been accounted for in the "Port Security" section. VSOs will be existing personnel on board vessels that will allocate part of their time toward security activities. Towing vessels will not have VSOs. For VSAs and VSPs, we assume the company will prepare the core documents, and there will be an incremental cost for each vessel included in the assessment or plan. The incremental cost added to each plan will be based on the number and type of vessels. We assume each hour of planning costs an average of $100/hour. This is a "loaded" labor rate, which means it includes the costs of benefits and other overhead costs. While some employees cost more than this and some cost less, we believe $100/hour is a reasonable average cost of the employees that would conduct this work. To calculate costs for VSAs and VSPs, we estimated number of hours that would be required initially (plan development and submission) and annually (plan updates), then multiplied by hourly cost.

For drilling, the time required will depend on the number of crewmembers aboard the vessel. We assume each hour of drilling also costs an average of $100/hour per crewmember (again, a loaded labor rate that represents an average cost of the labor performing these duties). Drilling for all vessels except towboats and barges will be conducted quarterly. Towboats and associated barges will drill under order of the COTP (approximately every 18 months). Table 4 summarizes personnel costs.

[1] Our use of "large" or "small" to characterize a vessel company does not have the same meaning as the SBA's definition. SBA uses NAICS, revenues, and number of employees to determine company size.

Table 4. Unit cost of personnel (loaded labor costs)

Personnel	Large company		Small company	
	Initial	Annual	Initial	Annual
CSO	$150,000	$150,000	$37,500	$37,500
CSO training	3,500	3,500	2,000	2,000
Training of key crew	5,000	5,000	3,500	3,500
VSO	5,000	5,000	5,000	5,000
VSA, non-towing	8,000	400	4,000	200
VSA, towing	1,600	100	800	100
VSP, non-towing	8,000	400	4,000	200
VSP, towing	1,600	100	800	100

Vessel costs

The following is a summary of the costs for each type of vessel. Company costs are estimated separately. These costs reflect the current state of the industry and the current level of compliance with security rulemakings already in effect, but not cost incurred in response to the events of September 11, 2001. Since neither the ISPS Code nor the NVICs require specific equipment, we estimated what an "average" vessel within each service type would likely install.

Freight ships and barges

Tables 5–8 present the per-vessel cost for U.S.-flagged SOLAS and domestic freight ships and freight barges.

Table 5. Cost per U.S.-flagged SOLAS freight ship (241 vessels affected)

Item	Initial			Annual		
	Number	Cost/item	Total cost	Number	Cost/item	Total cost
Hand-held metal detector	2	$200	$400	2	$10	$20
Hand-held radio	5	200	1,000	5	10	50
Lock	10	300	3,000	10	15	150
Light	5	400	2,000	5	20	100
Auto-intrusion alarm	5	500	2,500	5	25	125
Ship security system	1	2,000	2,000	1	100	100
Portable vapor detector	1	8,000	8,000	1	400	400
VSO	1	5,000	5,000	1	5,000	5,000
VSA (incremental cost)	16.00 hrs	100/hr	1,600	0.02 hrs	100/hr	2
VSP (incremental cost)	4.00 hrs	100/hr	400	0.02 hrs	100/hr	2
Quarterly drills	-		-	1 hr, 15 crew	1,500/drill	6,000
Total cost per vessel			**$25,900**			**$11,949**

Table 6. Cost per U.S.-flagged SOLAS freight barge (2 vessels affected)

Item	Initial			Annual		
	Number	Cost/item	Total cost	Number	Cost/item	Total cost
VSA (incremental cost)	4.00 hrs	$100/hr	$400	0.02 hrs	$100/hr	$2
VSP (incremental cost)	0.25 hrs	100/hr	25	0.02 hrs	100/hr	2
Total cost per vessel			**$425**			**$4**

Table 7. Cost per domestic freight ship (99 vessels affected)

	Initial			Annual		
Item	Number	Cost/item	Total cost	Number	Cost/item	Total cost
Hand-held metal detector	2	$200	$400	2	$10	$20
Hand-held radio	5	200	1,000	5	10	50
Lock	10	300	3,000	10	15	150
Light	5	400	2,000	5	20	100
Auto-intrusion alarm	5	500	2,500	5	25	125
Portable vapor detector	1	8,000	8,000	1	400	400
VSO	1	5,000	5,000	1	5,000	5,000
VSA (incremental cost)	8.00 hrs	100/hr	800	0.02 hrs	100/hr	2
VSP (incremental cost)	4.00 hrs	100/hr	400	0.02 hrs	100/hr	2
Quarterly drills	-		-	1 hr, 15 crew	1,500/drill	6,000
Total cost per vessel			**$23,100**			**$11,849**

Table 8. Cost per domestic freight barge (262 vessels affected)

	Initial			Annual		
Item	Number	Cost/item	Total cost	Number	Cost/item	Total cost
VSA (incremental cost)	0.02 hrs	100/hr	$2	0.02 hrs	100/hr	2
VSP (incremental cost)	0.02 hrs	100/hr	2	0.02 hrs	100/hr	2
Total cost per vessel			**$4**			**$4**

Tank ships and barges

Tables 9–12 present the per-vessel cost for U.S.-flagged SOLAS and domestic tank ships and tank barges.

Table 9. Cost per U.S.-flagged SOLAS tank ship (114 vessels affected)

	Initial			Annual		
Item	Number	Cost/item	Total cost	Number	Cost/item	Total cost
Hand-held metal detector	1	$200	$200	1	$10	$10
Hand-held radio	5	200	1,000	5	10	50
Lock	10	300	3,000	10	15	150
Light	5	400	2,000	5	20	100
Auto-intrusion alarm	5	500	2,500	5	25	125
Ship security system	1	2,000	2,000	1	100	100
VSO	1	5,000	5,000	1	5,000	5,000
VSA (incremental cost)	16.00 hrs	100/hr	1,600	0.02 hrs	100/hr	2
VSP (incremental cost)	4.00 hrs	100/hr	400	0.02 hrs	100/hr	2
Quarterly drills	-		-	1 hr, 15 crew	1,500/drill	6,000
Total cost per vessel			**$17,700**			**$11,539**

Table 10. Cost per U.S.-flagged SOLAS tank barge (14 vessels affected)

	Initial			Annual		
Item	Number	Cost/item	Total cost	Number	Cost/item	Total cost
VSA (incremental cost)	4.00 hrs	$100/hr	$400	0.02 hrs	$100/hr	$2
VSP (incremental cost)	0.08 hrs	100/hr	8	0.02 hrs	100/hr	2
Total cost per vessel			**$408**			**$4**

Table 11. Cost per domestic tank ship (34 vessels affected)

	Initial			Annual		
Item	Number	Cost/item	Total cost	Number	Cost/item	Total cost
Hand-held metal detector	1	$200	$200	1	$10	$10
Hand-held radio	5	200	1,000	5	10	50
Lock	10	300	3,000	10	15	150
Light	5	400	2,000	5	20	100
Auto-intrusion alarm	5	500	2,500	5	25	125
VSO	1	5,000	5,000	1	5,000	5,000
VSA (incremental cost)	8.00 hrs	100/hr	800	0.02 hrs	100/hr	2
VSP (incremental cost)	4.00 hrs	100/hr	400	0.02 hrs	100/hr	2
Quarterly drills	-		-	1 hr, 15 crew	1,500/drill	6,000
Total cost per vessel			**$14,900**			**$11,439**

Table 12. Cost per domestic tank barge (2,891 vessels affected)

	Initial			Annual		
Item	Number	Cost/item	Total cost	Number	Cost/item	Total cost
VSA (incremental cost)	0.02 hrs	$100/hr	$2	0.02 hrs	$100/hr	$2
VSP (incremental cost)	0.02 hrs	100/hr	2	0.02 hrs	100/hr	2
Total cost per vessel			**$4**			**$4**

Uninspected vessels

Tables 13–15 present the per-vessel cost for U.S.-flagged SOLAS towboats and fish processors and domestic towboats.

Table 13. Cost per U.S.-flagged SOLAS towboat (14 vessels affected)

	Initial			Annual		
Item	Number	Cost/item	Total cost	Number	Cost/item	Total cost
Hand-held radio	1	$200	$200	1	10	10
Lock	3	300	900	3	15	45
Light	2	400	800	2	20	40
Ship security system	1	2,000	2,000	1	100	100
VSA (incremental cost)	8.00 hrs	100/hr	800	0.02 hrs	100/hr	2
VSP (incremental cost)	2.00 hrs	100/hr	200	0.02 hrs	100/hr	2
Total cost per vessel			**$4,900**			**$199**

Table 14. Cost per U.S.-flagged SOLAS fish processor (39 vessels affected)

	Initial			Annual		
Item	Number	Cost/item	Total cost	Number	Cost/item	Total cost
Hand-held metal detector	1	$200	$200	1	$10	$10
Hand-held radio	3	200	600	3	10	30
Lock	10	300	3,000	10	15	150
Light	2	400	800	2	20	40
Auto-intrusion alarm	2	500	1,000	2	25	50
Ship security system	1	2,000	2,000	1	100	100
VSO	1	5,000	5,000	1	5,000	5,000
VSA (incremental cost)	8.00 hrs	100/hr	800	0.02 hrs	100/hr	2
VSP (incremental cost)	2.00 hrs	100/hr	200	0.02 hrs	100/hr	2
Quarterly drills	-		-	1 hr, 5 crew	500/drill	2,000
Total cost per vessel			**$13,600**			**$7,384**

Table 15. Cost per domestic towboat (4,645 vessels affected)

	Initial			Annual		
Item	Number	Cost/item	Total cost	Number	Cost/item	Total cost
Lock	3	$300	$900	3	$15	$45
Light	2	400	800	2	20	40
VSA (incremental cost)	0.02 hrs	100/hr	2	0.02 hrs	100/hr	2
VSP (incremental cost)	0.02 hrs	100/hr	2	0.02 hrs	100/hr	2
Total cost per vessel			**$1,704**			**$89**

U.S.-flagged SOLAS passenger vessels

Tables 16 and 17 present the per-vessel cost for U.S.-flagged SOLAS passenger vessels.

Table 16. Cost per U.S.-flagged SOLAS cruise vessel (2 vessels affected)

	Initial			Annual		
Item	Number	Cost/item	Total cost	Number	Cost/item	Total cost
Hand-held radio	10	$200	$2,000	10	$10	$100
Ship security system	1	2,000	2,000	1	100	100
VSO	1	5,000	5,000	1	5,000	5,000
VSA (incremental cost)	24.00 hrs	100/hr	2,400	0.02 hrs	100/hr	2
VSP (incremental cost)	4.00 hrs	100/hr	400	0.02 hrs	100/hr	2
Quarterly drills	-		-	1 hr, 20 crew	2,000/drill	8,000
Total cost per vessel			**$11,800**			**$13,204**

Table 17. Cost per other U.S.-flagged SOLAS passenger vessel (109 vessels affected)

	Initial			Annual		
Item	Number	Cost/item	Total cost	Number	Cost/item	Total cost
Hand-held metal detector	2	$200	$400	2	$10	$20
Hand-held radio	5	200	1,000	5	10	50
Lock	20	300	6,000	20	15	300
Auto-intrusion alarm	5	500	2,500	5	25	125
Ship security system	1	2,000	2,000	1	100	100
Archway metal detector	1	5,500	5,500	1	275	275
VSO	1	5,000	5,000	1	5,000	5,000
VSA (incremental cost)	8.00 hrs	100/hr	800	0.02 hrs	100/hr	2
VSP (incremental cost)	2.00 hrs	100/hr	200	0.02 hrs	100/hr	2
Quarterly drills	-		-	1 hr, 10 crew	1,000/drill	4,000
Total cost per vessel			**$23,400**			**$9,874**

Passenger vessels ≤ 100 GT

Tables 18–20 present the per-vessel cost for domestic passenger vessels.

Table 18. Cost per domestic passenger vessel, not ferry (223 vessels affected)

	Initial			Annual		
Item	Number	Cost/item	Total cost	Number	Cost/item	Total cost
Hand-held metal detector	1	$200	$200	1	$10	$10
Hand-held radio	5	200	1,000	5	10	50
Lock	10	300	3,000	10	15	150
Light	5	400	2,000	5	20	100
VSO	1	5,000	5,000	1	5,000	5,000
VSA (incremental cost)	8.00 hrs	100/hr	800	0.02 hrs	100/hr	2
VSP (incremental cost)	4.00 hrs	100/hr	400	0.02 hrs	100/hr	2
Quarterly drills	-		-	1 hr, 5 crew	500/drill	2,000
Total cost per vessel			**$12,400**			**$7,314**

Table 19. Cost per domestic ferry > 500 passengers (43 vessels affected)

	Initial			Annual		
Item	Number	Cost/item	Total cost	Number	Cost/ item	Total cost
Hand-held metal detector	2	$200	$400	2	$10	$20
Hand-held radio	5	200	1,000	5	10	50
Lock	10	300	3,000	10	15	150
Light	5	400	2,000	5	20	100
Auto-intrusion alarm	5	500	2,500	5	25	125
Archway metal detector	2	5,500	11,000	2	275	550
Portable vapor detector	1	8,000	8,000	1	400	400
VSO	1	5,000	5,000	1	5,000	5,000
VSA (incremental cost)	8.00 hrs	100/hr	800	0.02 hrs	100/hr	2
VSP (incremental cost)	4.00 hrs	100/hr	400	0.02 hrs	100/hr	2
Quarterly drills	-		-	1 hr, 15 crew	1,500/drill	6,000
Total cost per vessel			**$34,100**			**$12,399**

Table 20. Cost per domestic ferry ≤ 500 passengers (435 vessels affected)

	Initial			Annual		
Item	Number	Cost/item	Total cost	Number	Cost/item	Total cost
Hand-held metal detector	2	$200	$400	2	$10	$20
Hand-held radio	5	200	1,000	5	10	50
Lock	10	300	3,000	10	15	150
Light	5	400	2,000	5	20	100
Portable vapor detector	1	8,000	8,000	1	400	400
VSO	1	5,000	5,000	1	5,000	5,000
VSA (incremental cost)	8.00 hrs	100/hr	800	0.02 hrs	100/hr	2
VSP (incremental cost)	4.00 hrs	100/hr	400	0.02 hrs	100/hr	2
Quarterly drills	-		-	1 hr, 10 crew	1,000/drill	4,000
Total cost per vessel			**$20,600**			**$9,724**

Passenger vessels > 100 GT

Tables 21–24 present the per-vessel cost for domestic passenger vessels.

Table 21. Cost per domestic cruise vessel (2 vessels affected)

	Initial			Annual		
Item	Number	Cost/item	Total cost	Number	Cost/item	Total cost
Hand-held radio	10	$200	$2,000	10	$10	$100
VSO	1	5,000	5,000	1	5,000	5,000
VSA (incremental cost)	16.00 hrs	100/hr	1,600	0.02 hrs	100/hr	2
VSP (incremental cost)	4.00 hrs	100/hr	400	0.02 hrs	100/hr	2
Quarterly drills	-		-	1 hr, 20 crew	2,000/drill	8,000
Total cost per vessel			**$9,000**			**$13,104**

Table 22. Cost per domestic passenger vessel, not ferry (67 vessels affected)

	Initial			Annual		
Item	Number	Cost/item	Total cost	Number	Cost/item	Total cost
Hand-held metal detector	1	$200	$200	1	$10	$10
Hand-held radio	10	200	2,000	10	10	100
Lock	20	300	6,000	20	15	300
Camera	5	475	2,375	5	24	120
Auto-intrusion alarm	10	500	5,000	10	25	250
VSO	1	5,000	5,000	1	5,000	5,000
VSA (incremental cost)	8.00 hrs	100/hr	800	0.02 hrs	100/hr	2
VSP (incremental cost)	4.00 hrs	100/hr	400	0.02 hrs	100/hr	2
Quarterly drills			-	1 hr, 10 crew	1,000/drill	4,000
Total cost per vessel			**$21,775**			**$9,784**

Table 23. Cost per domestic ferry > 500 passengers (49 vessels affected)

	Initial			Annual		
Item	Number	Cost/item	Total cost	Number	Cost/item	Total cost
Hand-held metal detector	2	$200	$400	2	$10	$20
Hand-held radio	10	200	2,000	10	10	100
Lock	20	300	6,000	20	15	300
Camera	5	475	2,375	5	24	120
Auto-intrusion alarm	10	500	5,000	10	25	250
Archway metal detector	2	5,500	11,000	2	275	550
Portable vapor detector	1	8,000	8,000	1	400	400
X-ray baggage machine	1	39,000	39,000	1	1,950	1,950
VSO	1	5,000	5,000	1	5,000	5,000
VSA (incremental cost)	8.00 hrs	100/hr	800	0.02 hrs	100/hr	2
VSP (incremental cost)	4.00 hrs	100/hr	400	0.02 hrs	100/hr	2
Quarterly drills	-		-	1 hr, 15 crew	1,500/drill	6,000
Total cost per vessel			**$79,975**			**$14,694**

Table 24. Cost per domestic ferry ≤ 500 passengers (92 vessels affected)

	Initial			Annual		
Item	Number	Cost/item	Total cost	Number	Cost/item	Total cost
Hand-held metal detector	2	$200	$400	2	$10	$20
Hand-held radio	5	200	1,000	5	10	50
Lock	20	300	6,000	20	15	300
Auto-intrusion alarm	5	500	2,500	5	25	125
Archway metal detector	2	5,500	11,000	2	275	550
Portable vapor detector	1	8,000	8,000	1	400	400
VSO	1	5,000	5,000	1	5,000	5,000
VSA (incremental cost)	8.00 hrs	100/hr	800	0.02 hrs	100/hr	2
VSP (incremental cost)	4.00 hrs	100/hr	400	0.02 hrs	100/hr	2
Quarterly drills	-		-	1 hr, 10 crew	1,000/drill	4,000
Total cost per vessel			**$35,100**			**$10,449**

MODUs

Tables 25 and 26 present the per-vessel cost for U.S.-flagged SOLAS and domestic MODUs.

Table 25. Cost per U.S.-flagged SOLAS MODU (2 vessels affected)

	Initial			Annual		
Item	Number	Cost/item	Total cost	Number	Cost/item	Total cost
Hand-held radio	5	$200	$1,000	5	$10	$50
Lock	10	300	3,000	10	15	150
Light	5	400	2,000	5	20	100
Auto-intrusion alarm	5	500	2,500	5	25	125
Ship security system	1	2,000	2,000	1	100	100
VSO	1	5,000	5,000	1	5,000	5,000
VSA (incremental cost)	16.00 hrs	100/hr	1,600	0.02 hrs	100/hr	2
VSP (incremental cost)	4.00 hrs	100/hr	400	0.02 hrs	100/hr	2
Quarterly drills	-		-	1 hr, 10 crew	1,000/drill	4,000
Total cost per vessel			**$17,500**			**$9,529**

Table 26. Cost per domestic MODU (159 vessels affected)

	Initial			Annual		
Item	Number	Cost/item	Total cost	Number	Cost/item	Total cost
Hand-held radio	5	$200	$1,000	5	$10	$50
Lock	10	300	3,000	10	15	150
Light	5	400	2,000	5	20	100
Auto-intrusion alarm	5	500	2,500	5	25	125
VSO	1	5,000	5,000	1	5,000	5,000
VSA (incremental cost)	16.00 hrs	100/hr	1,600	0.02 hrs	100/hr	2
VSP (incremental cost)	4.00 hrs	100/hr	400	0.02 hrs	100/hr	2
Quarterly drills	-		-	1 hr, 10 crew	1,000/drill	4,000
Total cost per vessel			**$15,500**			**$9,429**

OSVs

Tables 27 and 28 present the per-vessel cost for U.S.-flagged SOLAS and domestic OSVs.

Table 27. Cost per U.S.-flagged SOLAS OSV (75 vessels affected)

	Initial			Annual		
Item	Number	Cost/item	Total cost	Number	Cost/item	Total cost
Hand-held metal detector	1	$200	$200	1	$10	$10
Hand-held radio	3	200	600	3	10	30
Lock	10	300	3,000	10	15	150
Light	2	400	800	2	20	40
Auto-intrusion alarm	2	500	1,000	2	25	50
Ship security system	1	2,000	2,000	1	100	100
VSO	1	5,000	5,000	1	5,000	5,000
VSA (incremental cost)	8.00 hrs	100/hr	800	0.02 hrs	100/hr	2
VSP (incremental cost)	4.00 hrs	100/hr	400	0.02 hrs	100/hr	2
Quarterly drills	-		-	1 hr, 4 crew	400/drill	1,600
Total cost per vessel			**$13,800**			**$6,984**

Table 28. Cost per domestic OSV (983 vessels affected)

	Initial			Annual		
Item	Number	Cost/item	Total cost	Number	Cost/item	Total cost
Hand-held metal detector	1	$200	$200	1	$10	$10
Hand-held radio	3	200	600	3	10	30
Lock	10	300	3,000	10	15	150
Light	2	400	800	2	20	40
Auto-intrusion alarm	2	500	1,000	2	25	50
VSO	1	5,000	5,000	1	5,000	5,000
VSA (incremental cost)	8.00 hrs	100/hr	800	0.02 hrs	100/hr	2
VSP (incremental cost)	4.00 hrs	100/hr	400	0.02 hrs	100/hr	2
Quarterly drills	-		-	1 hr, 4 crew	400/drill	1,600
Total cost per vessel			**$11,800**			**$6,884**

Other U.S.-flagged SOLAS vessels

Tables 29–31 present the per-vessel cost for other U.S.-flagged SOLAS vessels.

Table 29. Cost per U.S.-flagged SOLAS oil recovery vessel (1 vessel affected)

	Initial			Annual		
Item	Number	Cost/item	Total cost	Number	Cost/item	Total cost
Hand-held radio	3	$200	$600	3	$10	$30
Lock	10	300	3,000	10	15	150
Light	2	400	800	2	20	40
Auto-intrusion alarm	2	500	1,000	2	25	50
Ship security system	1	2,000	2,000	1	100	100
VSO	1	5,000	5,000	1	5,000	5,000
VSA (incremental cost)	8.00 hrs	100/hr	800	0.02 hrs	100/hr	2
VSP (incremental cost)	2.00 hrs	100/hr	200	0.02 hrs	100/hr	2
Quarterly drills	-		-	1 hr, 3 crew	300/drill	1,200
Total cost per vessel			**$13,400**			**$6,574**

Table 30. Cost per U.S.-flagged SOLAS research vessel (8 vessels affected)

	Initial			Annual		
Item	Number	Cost/item	Total cost	Number	Cost/item	Total cost
Hand-held radio	3	$200	$600	3	$10	$30
Lock	10	300	3,000	10	15	150
Light	2	400	800	2	20	40
Auto-intrusion alarm	2	500	1,000	2	25	50
Ship security system	1	2,000	2,000	1	100	100
VSO	1	5,000	5,000	1	5,000	5,000
VSA (incremental cost)	8.00 hrs	100/hr	800	0.02 hrs	100/hr	2
VSP (incremental cost)	2.00 hrs	100/hr	200	0.02 hrs	100/hr	2
Quarterly drills	-		-	1 hr, 5 crew	500/drill	2,000
Total cost per vessel			**$13,400**			**$7,374**

Table 31. Cost per U.S.-flagged SOLAS industrial vessel (20 vessels affected)

	Initial			Annual		
Item	Number	Cost/item	Total cost	Number	Cost/item	Total cost
Hand-held radio	1	$200	$200	1	$10	$10
Lock	3	300	900	3	15	45
Light	2	400	800	2	20	40
Ship security system	1	2,000	2,000	1	100	100
VSO	1	5,000	5,000	1	5,000	5,000
VSA (incremental cost)	8.00 hrs	100/hr	800	0.02 hrs	100/hr	2
VSP (incremental cost)	2.00 hrs	100/hr	200	0.02 hrs	100/hr	2
Quarterly drills	-		-	1 hr, 5 crew	500/drill	2,000
Total cost per vessel			**$9,900**			**$7,199**

Company costs

The cost per company depends on the number and type of vessels a company owns. For this analysis, companies are defined as follows.

- Large non-towing company—company owns more than 10 vessels, none is a towboat or barge; there are 19 companies in our population
- Large towing company—company owns more than 10 vessels, at least one is a towboat or barge; there are 10 companies in our population
- Small non-towing company—company owns 10 or fewer vessels, none is a towboat or barge; there are 616 companies in our population
- Small towing company—company owns only towboats or barges, regardless of the number; there are 1,398 companies in our population
- U.S.-flagged SOLAS company—treated as a large non-towing company; there are 167 companies in our population

The cost per company by type is presented in Table 32.

Table 32. Cost per company by type

Company type	Initial	Annual
Large non-towing company		
CSO	$150,000	$150,000
CSO training	3,500	3,500
Training of key crew	5,000	5,000
VSA	8,000	400
VSP	8,000	400
Total cost	**$174,500**	**$159,300**
Large towing company		
CSO	$150,000	$150,000
CSO training	3,500	3,500
Training of key crew	5,000	5,000
VSA	1,600	100
VSP	1,600	100
Total cost	**$161,700**	**$158,700**
Small non-towing company		
CSO	$37,500	$37,500
CSO training	2,000	2,000
Training of key crew	3,500	3,500
VSA	4,000	200
VSP	4,000	200
Total cost	**$51,000**	**$43,400**
Small towing company		
CSO	$37,500	$37,500
CSO training	2,000	2,000
Training of key crew	3,500	3,500
VSA	800	100
VSP	800	100
Total cost	**$44,600**	**$43,200**

To calculate total costs per company, we added the company-level costs (above) and the vessel-level costs (equipment, VSO, incremental VSA and VSP costs, drilling). Example calculations are presented below. The companies in these examples are good representations of the types of companies affected.

Example 1 – U.S.-flagged SOLAS company

Company A owns 2 freight ships, 4 industrial vessels, 20 OSVs, and 4 research vessels, all of which are U.S.-flagged SOLAS vessels. The initial and annual costs for this company are presented in Table 33.

Table 33. Example cost for U.S.-flagged SOLAS company

		Initial		Annual	
Cost	Number	Cost/item	Total cost	Cost/item	Total cost
Company (Table 32)	1	$174,500	$174,500	$159,300	$159,300
Freight ships (Table 5)	2	25,900	51,800	11,949	23,898
Industrial vessels (Table 31)	4	9,900	39,600	7,199	28,796
OSVs (Table 27)	20	13,800	276,000	6,984	139,680
Research vessels (Table 30)	4	13,400	53,600	7,374	29,496
Total company cost			**$595,500**		**$381,170**

Example 2a – large non-towing company (no passenger vessels)

Company B owns 19 MODUs and 25 OSVs (i.e., no passenger vessels). The initial and annual costs for this company are presented in Table 34.

Table 34. Example cost for large non-towing company (no passenger vessels)

Cost	Number	Initial		Annual	
		Cost/item	Total cost	Cost/item	Total cost
Company (Table 32)	1	$174,500	$174,500	$159,300	$159,300
MODUs (Table 26)	19	15,500	294,500	9,429	179,151
OSVs (Table 28)	25	11,800	295,000	6,884	172,100
Total company cost			**$764,000**		**$510,551**

Example 2b – large non-towing company (with passenger vessels)

Company C owns 9 ferries 100 GT or less carrying fewer than 500 passengers, 11 ferries over 100 GT carrying more than 500 passengers, and 14 ferries over 100 GT carrying fewer than 500 passengers. The initial and annual costs for this company are presented in Table 35.

Table 35. Example cost for large non-towing company (with passenger vessels)

Cost	Number	Initial		Annual	
		Cost/item	Total cost	Cost/item	Total cost
Company (Table 32)	1	$174,500	$174,500	$159,300	$159,300
Ferries, ≤ 100 GT, ≤ 500 pass. (Table 20)	9	20,600	185,400	9,724	87,516
Ferries, > 100 GT, > 500 pass. (Table 23)	11	79,975	879,725	14,694	161,634
Ferries, > 100 GT, ≤ 500 pass. (Table 24)	14	35,100	491,400	10,449	146,286
Total company cost			**$1,731,025**		**$544,736**

Example 3 – large towing company

Company D owns 12 OSVs and 5 towboats. The initial and annual costs for this company are presented in Table 36.

Table 36. Example cost for large towing company

Cost	Number	Initial		Annual	
		Cost/item	Total cost	Cost/item	Total cost
Company (Table 32)	1	$161,700	$161,700	$158,700	$158,700
OSVs (Table 28)	12	11,800	141,600	6,884	82,608
Towboats (Table 15)	5	1,704	8,520	89	445
Total company cost			**$311,820**		**$241,753**

Example 4 – small non-towing company

Company E owns 3 ferries 100 GT or less carrying more than 500 passengers and 6 ferries 100 GT or less carrying fewer than 500 passengers. The initial and annual costs for this company are presented in Table 37.

Table 37. Example cost for small non-towing company

Cost	Number	Initial		Annual	
		Cost/item	Total cost	Cost/item	Total cost
Company (Table 32)	1	$51,000	$51,000	$43,400	$43,400
Large ferries (Table 19)	3	34,100	102,300	12,399	37,197
Small ferries (Table 20)	6	20,600	123,600	9,724	58,344
Total company cost			**$276,900**		**$138,941**

Example 5 – small towing company

Company F owns 1 freight barge, 6 tank barges, and 6 towboats. The initial and annual costs for this company are presented in Table 38.

Table 38. Example cost for small towing company

		Initial		Annual	
Cost	Number	Cost/item	Total cost	Cost/item	Total cost
Company (Table 32)	1	$44,600	$44,600	$43,200	$43,200
Freight barges (Table 8)	1	4	4	4	4
Tank barges (Table 12)	6	4	24	4	24
Towboats (Table 15)	6	1,704	10,224	89	534
Total company cost			**$54,852**		**$43,762**

Total national cost of vessel security

The national cost of vessel security is the sum of the individual cost estimated for each company affected. National cost is discounted to its PV at 7 percent (2003–2012). The national initial and annual cost is presented in Table 39.

Table 39. Total national PV cost for vessel security, in $millions (2003-2012, 7 percent discount rate)

	U.S.-flagged SOLAS	Domestic	Total	PV total
2003 (initial)	$42	$146	$188	$188
2004 (annual)	33	111	144	135
2005 (annual)	33	111	144	126
2006 (annual)	33	111	144	118
2007 (annual)	33	111	144	110
2008 (annual)	33	111	144	103
2009 (annual)	33	111	144	96
2010 (annual)	33	111	144	90
2011 (annual)	33	111	144	84
2012 (annual)	33	111	144	79
Total cost ($m)	**$339**	**$1,145**	**$1,484**	**$1,129**

Table 40 presents the national cost for different elements of compliance for U.S.-flagged SOLAS and domestic vessels (these costs are not discounted).

Table 40. Total national initial and annual cost by element of compliance, in $millions

	Initial				Annual			
Cost	U.S.-flagged SOLAS	Percent of total	Domestic	Percent of total	U.S.-flagged SOLAS	Percent of total	Domestic	Percent of total
Equipment	$10	24%	$36	25%	$1	3%	$1	1%
Drilling	0	0%	0	0%	2	6%	7	6%
VSO	3	7%	11	8%	3	9%	11	10%
CSO, training	25	60%	89	61%	26	79%	91	82%
Paperwork	4	9%	10	6%	1	3%	1	1%
Total	$42	100%	$146	100%	$33	100%	$111	100%

As shown, CSOs and training are the driving costs both initially and annually. In the initial year, equipment accounts for approximately 25 percent of the total cost. Following implementation, drilling and VSO costs are a notable portion of the costs.

Facility security

Summary

Note: for definition of acronyms throughout this analysis, refer to the list at the beginning of the report.

Implementing the ISPS Code could affect about 4,400 facilities.

The estimated cost for U.S. facilities to implement the ISPS Code is PV $4.4 billion (2003 to 2012, 7 percent discount rate). Approximately PV $2.4 billion of this total is attributable to facilities engaged in the transfer of hazardous bulk liquids (petroleum, edible oils, and liquefied gases). The remaining PV $2.0 billion is attributable to facilities that receive ships on international voyages or carry more than 149 passengers. During the initial year of compliance, the cost is attributable to purchasing equipment, hiring security officers, and preparing paperwork. The initial cost is an estimated $963 million (non-discounted, $478 million for the facilities with hazardous bulk liquids, $485 million for the other facilities). Following initial implementation, the annual cost is an estimated $535 million (non-discounted, $300 million for the facilities with hazardous bulk liquids, $235 million for the other facilities).

Approximately 46 percent of the initial cost is for installing or upgrading equipment, 37 percent for hiring and training FSOs,[2] 13 percent for hiring additional security guards, and 4 percent for paperwork (FSAs and FSPs). Following the first year, approximately 4 percent of the annual cost is for O&M for equipment, 66 percent for FSOs, 23 percent for security guards, 7 percent for drills, and approximately 1 percent for paperwork (updating FSAs and FSPs). Installing or upgrading equipment and FSOs are the primary cost drivers for the cost of facility security.

The paperwork burden for developing FSAs and FSPs is approximately 465,000 hours during the initial year. In subsequent years, the annual burden is approximately 17,000 hours.

Analysis

Period of analysis

The period of analysis is 2003–2012 (10 years). Implementation will become effective in 2004, but we assume that companies will purchase equipment and develop security plans prior to the effective date. We assume, therefore, that initial costs will be incurred in 2003, and annual costs will be incurred each year 2004–2012.

Population affected

Implementing the ISPS Code would affect about 4,400 facilities that engage in the transfer of hazardous substances or that service vessels on international voyages. The facility population affected is presented in Table 41. To determine the number of facilities we used data from the U.S. Army Corps of Engineers, DOT's National Ferry Database, and the Coast Guard's MSMS database.

[2] The ISPS Code provides requirements for "Port Facilities." The Coast Guard, however, differentiates between ports and facilities in domestic regulations. As a result, for the purposes of this cost analysis, the terms PFSO, PFSA, and PFSP have been replaced with FSO, FSA, and FSP for the facility security section.

Table 41. Estimated facility population[1,2,3]

Facility	Count	Percent[4]
Container and break-bulk	263	6.0%
Dry bulk	255	5.8%
Hazardous bulk liquid	2,718	6.2%
Hazardous substance (other)	565	12.9%
Other bulk liquid	150	3.4%
Ferry	306	7.0%
Other passenger	108	2.5%
Total	**4,365**	**100.0%**

[1] Facilities that transfer, store, or otherwise contain hazardous cargoes.
[2] Facilities servicing vessels that carry more than 149 passengers.
[3] Facilities receiving ships on international voyages.
[4] Sum may not add to total due to independent rounding.

Container and break-bulk facilities include container, general cargo, and Ro-Ro facilities. Hazardous bulk liquid facilities include petroleum, liquefied gases, and edible oils. Other hazardous substances are dry hazardous cargoes specified in 33 CFR 126, 127, and 154. The cargoes are further discussed in 49 CFR 172 and 46 CFR 148.

We recognize that not all facilities will incur the same cost for personnel salaries, hire the same number of security guards or spend the same hours in drafting FSAs and FSPs. For the purpose of this analysis we have divided the facility population in two. One group is composed of one third of all facilities and would pay high salaries, hire more guards, and spend more time drafting FSAs and FSPs than the other group composed of two thirds of the total population. Facilities in the first group are addressed in this analysis as "A" and facilities in the second group as "B."

Unit cost assumptions

Equipment

Costs of equipment are based on internal Coast Guard data and market research. We estimate annual O&M cost for equipment is 5 percent of the purchase price. Not all facilities will install each piece of equipment. The unit costs for upgrading or installing equipment are presented in Table 42.

Table 42. Unit cost of equipment

Equipment	Initial	Annual
Hand-held radio	$200	$10
Upgrading/installing gates	100,000	5,000
Upgrading/installing CCTV	130,000	6,500
Upgrading/installing lights	200,000	10,000
Upgrading/installing communications system	300,000	15,000
Upgrading/installing fencing	500,000	25,000

Personnel, training, drilling, and planning

Costs of personnel and training are based on extensive research and previous Coast Guard analyses that estimated training and planning costs.

We assume that group A facilities will have a dedicated FSO while facilities in group B will have a part-time FSO (we estimate 0.25 or 0.5 of a dedicated person depending on the type of facility). FSOs or key facility personnel will have training annually as refresher courses and to address potential employee turnover within a facility. We also assume that the cost of a full time FSO is $150,000 per year. The ISPS Code requires all FSOs to participate in an annual security exercise; for the purposes of this analysis, these costs have been accounted for in the "Port Security" section.

The cost of a security guard was determined using the annual wage estimate from the 2001 National Occupation Employment and Wage Statistics published by the BLS. We took the annual salary for the upper 90th percentile of $28,660 per year and multiplied (or "loaded") this estimate by an assumed average benefit multiplier of 1.4 to create a wage that reflects current industry benefits and administrative costs paid by owners and operators. We assumed this higher-than-average wage reflects a full-time, permanent wage for skilled labor.

Personnel and training costs will be incurred each year of the analysis. Drilling costs will be incurred quarterly, but not initially. Planning costs will be incurred initially and annually, with more costs incurred initially as facilities develop their security plans.

We assume each hour of planning or drilling costs an average of $100/hour. This is a "loaded" labor rate, which means it includes the costs of benefits and other overhead costs. While some employees cost more than this and some cost less, we believe $100/hour is a reasonable average cost of the employees that would conduct this work. Drilling for all facilities will be conducted following initial implementation of the ISPS Code. We assume that conducting a quarterly drill would take about 2 hours per facility. We also assume that group A facilities will use 20 people in conducting the drill and that group B facilities will use 5 people. Table 43 summarizes personnel costs.

Table 43. Unit cost of personnel

	Group A		Group B dry bulk		Group B other	
Personnel	Initial	Annual	Initial	Annual	Initial	Annual
FSO	$150,000	$150,000	$75,000	$75,000	$37,500	$37,500
Security guard	40,000	40,000	40,000	40,000	40,000	40,000
FSA	8,000	400	4,000	100	4,000	100
FSP	8,000	400	4,000	100	4,000	100
Training	5,000	5,000	3,500	3,500	3,500	3,500
Quarterly drill	-	4,000	-	1,000	-	1,000

Facility costs

Facilities differ greatly from one another, and they must do a variety of activities to implement the ISPS Code. Within group A or group B facilities, we assume that a facility will have to upgrade/install equipment based on cargo received and current level of compliance with the ISPS Code. For example, to comply with the ISPS Code a facility may upgrade/install CCTV, lights, *or* fencing, but it does not have to do all three. For illustration purposes, Tables 44 and 45 present potential costs for a non-specific group A facility and a non-specific group B facility.

Table 44. Initial and annual cost for a non-specific group A facility

	Initial			Annual		
Item	Number	Cost/item	Total cost	Number	Cost/item	Total cost
Communications system	1	$300,000	$300,000	1	$15,000	$15,000
Gates	1	100,000	100,000	1	5,000	5,000
Hand-held radio	18	200	3,600	18	10	180
Security guards	9	40,000	360,000	9	40,000	360,000
FSO	1	150,000	150,000	1	150,000	150,000
Training	1	5,000	5,000	1	5,000	5,000
FSA	80 hrs	100/hr	8,000	4 hrs	100/hr	400
FSP	80 hrs	100/hr	8,000	4 hrs	100/hr	400
Quarterly drills	-		-	4	4,000	16,000
Base cost per facility			**$934,600**			**$551,980**
Cost per facility with CCTV	1	130,000	**$1,064,600**	1	6,500	**$558,480**
Cost per facility with lights	1	200,000	**$1,134,600**	1	10,000	**$561,980**
Cost per facility with fencing	1	500,000	**$1,434,600**	1	25,000	**$576,980**

Table 45. Initial and annual cost for a non-specific group B facility

Item	Initial			Annual		
	Number	Cost/item	Total cost	Number	Cost/item	Total cost
Communications system	1	$300,000	$300,000	1	$15,000	$15,000
Gates	1	100,000	100,000	1	5,000	5,000
Hand-held radio	18	200	3,600	18	10	180
Security guards	3	40,000	120,000	3	40,000	120,000
FSO	1	37,500	37,500	1	37,500	37,500
Training	1	3,500	3,500	1	3,500	3,500
FSA	40 hrs	100/hr	4,000	1 hr	100/hr	100
FSP	40 hrs	100/hr	4,000	1 hr	100/hr	100
Quarterly drills	-		-	4	1,000	4,000
Base cost per facility			**$572,600**			**$185,380**
Cost per facility with CCTV	1	130,000	**$702,600**	1	6,500	**$191,880**
Cost per facility with lights	1	200,000	**$772,600**	1	10,000	**$195,380**
Cost per facility with fencing	1	500,000	**$1,072,600**	1	25,000	**$210,380**

The estimated percentage of facilities that would need to purchase, install, or upgrade security measures is presented in Table 46. The figure in each cell represents the percentage of facilities of that type that would install or employ the various security items.

Table 46. Estimated percentage of facilities that will purchase or enhance security measures, by facility type[1,2,3]

Item	Container, break-bulk	Dry bulk	Haz. bulk liquid	Haz. sub other	Other bulk liquid	Ferry	Other passenger
Hand-held radio	5%	70%	5%	5%	10%	5%	5%
Gates	30	70	10	5	10	60 (A), 80 (B)	5
CCTV	5	10	5	5	10	10	5
Lights	5	60	5	5	10	10	5
Coms system	5	0	5	5	10	0	5
Fencing	5	20	5	5	10	50	5
Security guards	30	70	10	5	10	60 (A), 80 (B)	5

[1] Facilities that transfer, store, or otherwise contain hazardous cargoes.
[2] Facilities servicing vessels that carry more than 149 passengers.
[3] Facilities receiving ships on international voyages.

Tables 47 through 60 present initial and annual costs of complying with the ISPS Code for different types of facilities.

Table 47. Initial and annual cost for container or break-bulk facilities, group A (87 facilities)

Item	Number (%) estimated to purchase/draft	Initial			Annual		
		Number	Cost/item	Total cost	Number	Cost/item	Total cost
Coms system	4 (5%)	1	$300,000	$1,200,000	1	$15,000	$60,000
Gates	26 (30%)	1	100,000	2,600,000	1	5,000	130,000
Hand-held radio	4 (5%)	18	200	14,400	18	10	720
CCTV	4 (5%)	1	130,000	520,000	1	6,500	26,000
Lights	4 (5%)	1	200,000	800,000	1	10,000	40,000
Fencing	4 (5%)	1	500,000	2,000,000	1	25,000	100,000
Security guards	26 (30%)	15	40,000	15,600,000	15	40,000	15,600,000
FSO	87 (100%)	1	150,000	13,050,000	1	150,000	13,050,000
Training	87 (100%)	1	5,000	435,000	1	5,000	435,000
FSA	87 (100%)	1	8,000	696,000	1	400	34,800
FSP	87 (100%)	1	8,000	696,000	1	400	34,800
Quarterly drills	87 (100%)	-		-	1	16,000	1,392,000
Total cost				**$37,611,400**			**$30,903,320**

Table 48. Initial and annual cost for container or break-bulk facilities, group B (176 facilities)

Item	Number (%) estimated to purchase/draft	Initial			Annual		
		Number	Cost/item	Total cost	Number	Cost/item	Total cost
Coms system	9 (5%)	1	$300,000	$2,700,000	1	$15,000	$135,000
Gates	53 (30%)	1	100,000	5,300,000	1	5,000	265,000
Hand-held radio	9 (5%)	18	200	32,400	18	10	1,620
CCTV	9 (5%)	1	130,000	1,170,000	1	6,500	58,500
Lights	9 (5%)	1	200,000	1,800,000	1	10,000	90,000
Fencing	9 (5%)	1	500,000	4,500,000	1	25,000	225,000
Security guards	53 (30%)	4	40,000	8,480,000	4	40,000	8,480,000
FSO	176 (100%)	1	37,500	6,600,000	1	37,500	6,600,000
Training	176 (100%)	1	3,500	616,000	1	3,500	616,000
FSA	176 (100%)	1	4,000	704,000	1	100	17,600
FSP	176 (100%)	1	4,000	704,000	1	100	17,600
Quarterly drills	176 (100%)	-		-	1	4,000	704,000
Total cost				**$32,606,400**			**$17,210,320**

Table 49. Initial and annual cost for dry bulk facilities, group A (84 facilities)

Item	Number (%) estimated to purchase/draft	Initial			Annual		
		Number	Cost/item	Total cost	Number	Cost/item	Total cost
Gates	59 (70%)	1	$100,000	$5,900,000	1	$5,000	$295,000
Hand-held radio	59 (70%)	2	200	23,600	2	10	1,180
CCTV	8 (10%)	1	130,000	1,040,000	1	6,500	52,000
Lights	50 (60%)	1	200,000	10,000,000	1	10,000	500,000
Fencing	17 (20%)	1	500,000	8,500,000	1	25,000	425,000
Security guards	59 (70%)	2	40,000	4,720,000	2	40,000	4,720,000
FSO	84 (100%)	1	150,000	12,600,000	1	150,000	12,600,000
Training	84 (100%)	1	5,000	420,000	1	5,000	420,000
FSA	84 (100%)	1	8,000	672,000	1	400	33,600
FSP	84 (100%)	1	8,000	672,000	1	400	33,600
Quarterly drills	84 (100%)	-		-	1	16,000	1,344,000
Total cost				**$44,547,600**			**$20,424,380**

Table 50. Initial and annual cost for dry bulk facilities, group B (171 facilities)

Item	Number (%) estimated to purchase/draft	Initial			Annual		
		Number	Cost/item	Total cost	Number	Cost/item	Total cost
Gates	120 (70%)	1	$100,000	$12,000,000	1	$5,000	$600,000
Hand-held radio	120 (70%)	2	200	48,000	2	10	2,400
CCTV	17 (10%)	1	130,000	2,210,000	1	6,500	110,500
Lights	103 (60%)	1	200,000	20,600,000	1	10,000	1,030,000
Fencing	34 (20%)	1	500,000	17,000,000	1	25,000	850,000
Security guards	120 (70%)	1	40,000	4,800,000	1	40,000	4,800,000
FSO	171 (100%)	1	75,000	12,825,000	1	75,000	12,825,000
Training	171 (100%)	1	3,500	598,500	1	3,500	598,500
FSA	171 (100%)	1	4,000	684,000	1	100	17,100
FSP	171 (100%)	1	4,000	684,000	1	100	17,100
Quarterly drills	171 (100%)	-		-	1	4,000	684,000
Total cost				**$71,449,500**			**$21,534,600**

Table 51. Initial and annual cost for hazardous bulk liquid facilities, group A (897 facilities)

Item	Number (%) estimated to purchase/draft	Initial			Annual		
		Number	Cost/item	Total cost	Number	Cost/item	Total cost
Coms system	45 (5%)	1	$300,000	$13,500,000	1	$15,000	$675,000
Gates	90 (10%)	1	100,000	9,000,000	1	5,000	450,000
Hand-held radio	45 (5%)	18	200	162,000	18	10	8,100
CCTV	45 (5%)	1	130,000	5,850,000	1	6,500	292,500
Lights	45 (5%)	1	200,000	9,000,000	1	10,000	450,000
Fencing	45 (5%)	1	500,000	22,500,000	1	25,000	1,125,000
Security guards	90 (10%)	9	40,000	32,400,000	9	40,000	32,400,000
FSO	897 (100%)	1	150,000	134,550,000	1	150,000	134,550,000
Training	897 (100%)	1	5,000	4,485,000	1	5,000	4,485,000
FSA	897 (100%)	1	8,000	7,176,000	1	400	358,800
FSP	897 (100%)	1	8,000	7,176,000	1	400	358,800
Quarterly drills	897 (100%)	-		-	1	16,000	14,352,000
Total cost				**$245,799,000**			**$189,505,200**

Table 52. Initial and annual cost for hazardous bulk liquid facilities, group B (1,821 facilities)

Item	Number (%) estimated to purchase/draft	Initial			Annual		
		Number	Cost/item	Total cost	Number	Cost/item	Total cost
Coms system	91 (5%)	1	$300,000	$27,300,000	1	$15,000	$1,365,000
Gates	182 (10%)	1	100,000	18,200,000	1	5,000	910,000
Hand-held radio	91 (5%)	18	200	327,600	18	10	16,380
CCTV	91 (5%)	1	130,000	11,830,000	1	6,500	591,500
Lights	91 (5%)	1	200,000	18,200,000	1	10,000	910,000
Fencing	91 (5%)	1	500,000	45,500,000	1	25,000	2,275,000
Security guards	182 (10%)	3	40,000	21,840,000	3	40,000	21,840,000
FSO	1,821 (100%)	1	37,500	68,287,500	1	37,500	68,287,500
Training	1,821 (100%)	1	3,500	6,373,500	1	3,500	6,373,500
FSA	1,821 (100%)	1	4,000	7,284,000	1	100	182,100
FSP	1,821 (100%)	1	4,000	7,284,000	1	100	182,100
Quarterly drills	1,821 (100%)	-		-	1	4,000	7,284,000
Total cost				**$232,426,600**			**$110,217,080**

Table 53. Initial and annual cost for hazardous substance (other) facilities, group A (186 facilities)

Item	Number (%) estimated to purchase/draft	Initial			Annual		
		Number	Cost/item	Total cost	Number	Cost/item	Total cost
Coms system	9 (5%)	1	$300,000	$2,700,000	1	$15,000	$135,000
Gates	9 (5%)	1	100,000	900,000	1	5,000	45,000
Hand-held radio	9 (5%)	18	200	32,400	18	10	1,620
CCTV	9 (5%)	1	130,000	1,170,000	1	6,500	58,500
Lights	9 (5%)	1	200,000	1,800,000	1	10,000	90,000
Fencing	9 (5%)	1	500,000	4,500,000	1	25,000	225,000
Security guards	9 (5%)	9	40,000	3,240,000	9	40,000	3,240,000
FSO	186 (100%)	1	150,000	27,900,000	1	150,000	27,900,000
Training	186 (100%)	1	5,000	930,000	1	5,000	930,000
FSA	186 (100%)	1	8,000	1,488,000	1	400	74,400
FSP	186 (100%)	1	8,000	1,488,000	1	400	74,400
Quarterly drills	186 (100%)	-		-	1	16,000	2,976,000
Total cost				**$46,148,400**			**$35,749,920**

Table 54. Initial and annual cost for hazardous substance (other) facilities, group B (379 facilities)

Item	Number (%) estimated to purchase/draft	Initial			Annual		
		Number	Cost/item	Total cost	Number	Cost/item	Total cost
Coms system	19 (5%)	1	$300,000	$5,700,000	1	$15,000	$285,000
Gates	19 (5%)	1	100,000	1,900,000	1	5,000	95,000
Hand-held radio	19 (5%)	18	200	68,400	18	10	3,420
CCTV	19 (5%)	1	130,000	2,470,000	1	6,500	123,500
Lights	19 (5%)	1	200,000	3,800,000	1	10,000	190,000
Fencing	19 (5%)	1	500,000	9,500,000	1	25,000	475,000
Security guards	19 (5%)	3	40,000	2,280,000	3	40,000	2,280,000
FSO	379 (100%)	1	37,500	14,212,500	1	37,500	14,212,500
Training	379 (100%)	1	3,500	1,326,500	1	3,500	1,326,500
FSA	379 (100%)	1	4,000	1,516,000	1	100	37,900
FSP	379 (100%)	1	4,000	1,516,000	1	100	37,900
Quarterly drills	379 (100%)	-		-	1	4,000	1,516,000
Total cost				**$44,289,400**			**$20,582,720**

Table 55. Initial and annual cost for other bulk liquid facilities, group A (50 facilities)

Item	Number (%) estimated to purchase/draft	Initial			Annual		
		Number	Cost/item	Total cost	Number	Cost/item	Total cost
Coms system	5 (10%)	1	$300,000	$1,500,000	1	$15,000	$75,000
Gates	5 (10%)	1	100,000	500,000	1	5,000	25,000
Hand-held radio	5 (10%)	18	200	18,000	18	10	900
CCTV	5 (10%)	1	130,000	650,000	1	6,500	32,500
Lights	5 (10%)	1	200,000	1,000,000	1	10,000	50,000
Fencing	5 (10%)	1	500,000	2,500,000	1	25,000	125,000
Security guards	5 (10%)	2	40,000	400,000	2	40,000	400,000
FSO	50 (100%)	1	150,000	7,500,000	1	150,000	7,500,000
Training	50 (100%)	1	5,000	250,000	1	5,000	250,000
FSA	50 (100%)	1	8,000	400,000	1	400	20,000
FSP	50 (100%)	1	8,000	400,000	1	400	20,000
Quarterly drills	50 (100%)	-		-	1	16,000	800,000
Total cost				**$15,118,000**			**$9,298,400**

Table 56. Initial and annual cost for other bulk liquid facilities, group B (100 facilities)

Item	Number (%) estimated to purchase/draft	Initial			Annual		
		Number	Cost/item	Total cost	Number	Cost/item	Total cost
Coms system	10 (10%)	1	$300,000	$3,000,000	1	$15,000	$150,000
Gates	10 (10%)	1	100,000	1,000,000	1	5,000	50,000
Hand-held radio	10 (10%)	18	200	36,000	18	10	1,800
CCTV	10 (10%)	1	130,000	1,300,000	1	6,500	65,000
Lights	10 (10%)	1	200,000	2,000,000	1	10,000	100,000
Fencing	10 (10%)	1	500,000	5,000,000	1	25,000	250,000
Security guards	10 (10%)	1	40,000	400,000	1	40,000	400,000
FSO	100 (100%)	1	75,000	7,500,000	1	75,000	7,500,000
Training	100 (100%)	1	3,500	350,000	1	3,500	350,000
FSA	100 (100%)	1	4,000	400,000	1	100	10,000
FSP	100 (100%)	1	4,000	400,000	1	100	10,000
Quarterly drills	100 (100%)	-		-	1	4,000	400,000
Total cost				**$21,386,000**			**$9,286,800**

Table 57. Initial and annual cost for ferry terminals, group A (101 facilities)

Item	Number (%) estimated to purchase/draft	Initial			Annual		
		Number	Cost/item	Total cost	Number	Cost/item	Total cost
Gates	61 (60%)	1	$100,000	$6,100,000	1	$5,000	$305,000
Hand-held radio	5 (5%)	12	200	12,000	12	10	600
CCTV	10 (10%)	1	130,000	1,300,000	1	6,500	65,000
Lights	10 (10%)	1	200,000	2,000,000	1	10,000	100,000
Fencing	51 (50%)	1	500,000	25,500,000	1	25,000	1,275,000
Security guards	61 (60%)	6	40,000	14,640,000	6	40,000	14,640,000
FSO	101 (100%)	1	150,000	15,150,000	1	150,000	15,150,000
Training	101 (100%)	1	5,000	505,000	1	5,000	505,000
FSA	101 (100%)	1	8,000	808,000	1	400	40,400
FSP	101 (100%)	1	8,000	808,000	1	400	40,400
Quarterly drills	101 (100%)	-		-	1	16,000	1,616,000
Total cost				**$66,823,000**			**$33,737,400**

Table 58. Initial and annual cost for ferry terminals, group B (205 facilities)

Item	Number (%) estimated to purchase/draft	Initial			Annual		
		Number	Cost/item	Total cost	Number	Cost/item	Total cost
Gates	164 (80%)	1	$30,000	4,920,000	1	$1,500	$246,000
Hand-held radio	10 (5%)	12	200	24,000	12	10	1,200
CCTV	21 (10%)	1	130,000	2,730,000	1	6,500	136,500
Lights	21 (10%)	1	200,000	4,200,000	1	10,000	210,000
Fencing	103 (50%)	1	500,000	51,500,000	1	25,000	2,575,000
Security guards	164 (80%)	2	40,000	13,120,000	2	40,000	13,120,000
FSO	205 (100%)	1	37,500	7,687,500	1	37,500	7,687,500
Training	205 (100%)	1	3,500	717,500	1	3,500	717,500
FSA	205 (100%)	1	4,000	820,000	1	100	20,500
FSP	205 (100%)	1	4,000	820,000	1	100	20,500
Quarterly drills	205 (100%)	-		-	1	4,000	820,000
Total cost				**$86,539,000**			**$25,554,700**

Table 59. Initial and annual cost for passenger terminals, group A (36 facilities)

Item	Number (%) estimated to purchase/draft	Initial			Annual		
		Number	Cost/item	Total cost	Number	Cost/item	Total cost
Coms system	2 (5%)	1	$300,000	$600,000	1	$15,000	$30,000
Gates	2 (5%)	1	100,000	200,000	1	5,000	10,000
Hand-held radio	2 (5%)	18	200	7,200	18	10	360
CCTV	2 (5%)	1	130,000	260,000	1	6,500	13,000
Lights	2 (5%)	1	200,000	400,000	1	10,000	20,000
Fencing	2 (5%)	1	500,000	1,000,000	1	25,000	50,000
Security guards	2 (5%)	15	40,000	1,200,000	15	40,000	1,200,000
FSO	36 (100%)	1	150,000	5,400,000	1	150,000	5,400,000
Training	36 (100%)	1	5,000	180,000	1	5,000	180,000
FSA	36 (100%)	1	8,000	288,000	1	400	14,400
FSP	36 (100%)	1	8,000	288,000	1	400	14,400
Quarterly drills	36 (100%)	-		-	1	16,000	576,000
Total cost				**$9,823,200**			**$7,508,160**

Table 60. Initial and annual cost for passenger terminals, group B (72 facilities)

Item	Number (%) estimated to purchase/draft	Initial			Annual		
		Number	Cost/item	Total cost	Number	Cost/item	Total cost
Coms system	4 (5%)	1	$300,000	$1,200,000	1	$15,000	$60,000
Gates	4 (5%)	1	100,000	400,000	1	5,000	20,000
Hand-held radio	4 (5%)	18	200	14,400	18	10	720
CCTV	4 (5%)	1	130,000	520,000	1	6,500	26,000
Lights	4 (5%)	1	200,000	800,000	1	10,000	40,000
Fencing	4 (5%)	1	500,000	2,000,000	1	25,000	100,000
Security guards	4 (5%)	4	40,000	640,000	4	40,000	640,000
FSO	72 (100%)	1	37,500	2,700,000	1	37,500	2,700,000
Training	72 (100%)	1	3,500	252,000	1	3,500	252,000
FSA	72 (100%)	1	4,000	288,000	1	100	7,200
FSP	72 (100%)	1	4,000	288,000	1	100	7,200
Quarterly drills	72 (100%)	-		-	1	4,000	288,000
Total cost				**$9,102,400**			**$4,141,120**

Example cost calculations for different facility owners are presented below. The companies in these examples are good representations of the types of companies affected.

Example 1 – ferry terminal owner

Company A owns 11 group A and 21 group B terminals. The estimated costs for this company are presented in Table 61.

Table 61. Example cost for ferry terminal owner

		Initial			Annual		
Item	Number (%) estimated to purchase/draft	Number	Cost/item	Total cost	Number	Cost/item	Total cost
Group A terminals							
Gates	7 (60%)	1	$100,000	$700,000	1	$5,000	$35,000
Hand-held radio	1 (5%)	12	200	2,400	12	10	120
CCTV	1 (10%)	1	130,000	130,000	1	6,500	6,500
Lights	1 (10%)	1	200,000	200,000	1	10,000	10,000
Fencing	6 (10%)	1	500,000	3,000,000	1	25,000	150,000
Security guards	7 (60%)	6	40,000	1,680,000	2	40,000	1,680,000
FSO	11 (100%)	1	150,000	1,650,000	1	150,000	1,650,000
Training	11 (100%)	1	5,000	55,000	1	5,000	55,000
FSA	11 (100%)	1	8,000	88,000	1	400	4,400
FSP	11 (100%)	1	8,000	88,000	1	400	4,400
Quarterly drills	11 (100%)	-		-	1	16,000	176,000
Subtotal				*$7,593,400*			*$3,771,420*
Group B terminals							
Gates	17 (80%)	1	$30,000	$510,000	1	$15,000	$25,500
Hand-held radio	1 (5%)	12	200	2,400	12	10	120
CCTV	2 (10%)	1	130,000	260,000	1	6,500	13,000
Lights	2 (10%)	1	200,000	400,000	1	10,000	20,000
Fencing	11 (50%)	1	500,000	5,500,000	1	25,000	275,000
Security guards	17 (80%)	2	40,000	1,360,000	2	40,000	1,360,000
FSO	21 (100%)	1	37,500	787,500	1	37,500	787,500
Training	21 (100%)	1	3,500	73,500	1	3,500	73,500
FSA	21 (100%)	1	4,000	84,000	1	100	2,100
FSP	21 (100%)	1	4,000	84,000	1	100	2,100
Quarterly drills	21 (100%)	-		-	1	4,000	84,000
Subtotal				*$9,061,400*			*$2,642,820*
Grand total				**$16,654,800**			**$6,414,240**

Example 2 – dry bulk facility owner

Company B owns 7 group A and 13 group B dry bulk facilities. The estimated costs for this company are presented in Table 62.

Table 62. Example cost for dry bulk facility owner

Item	Number (%) estimated to purchase/draft	Initial			Annual		
		Number	Cost/item	Total cost	Number	Cost/item	Total cost
Group A facilities							
Gates	5 (70%)	1	$100,000	$500,000	1	$5,000	$25,000
Hand-held radio	5 (70%)	2	200	2,000	2	10	100
CCTV	1 (10%)	1	130,000	130,000	1	6,500	6,500
Lights	4 (60%)	1	200,000	800,000	1	10,000	40,000
Fencing	1 (20%)	1	500,000	500,000	1	25,000	25,000
Security guards	5 (70%)	2	40,000	400,000	2	40,000	400,000
FSO	7 (100%)	1	150,000	1,050,000	1	150,000	1,050,000
Training	7 (100%)	1	5,000	35,000	1	5,000	35,000
FSA	7 (100%)	1	8,000	56,000	1	400	2,800
FSP	7 (100%)	1	8,000	56,000	1	400	2,800
Quarterly drills	7 (100%)	-		-	1	16,000	112,000
Subtotal				*$3,529,000*			*$1,699,200*
Group B facilities							
Gates	9 (70%)	1	$100,000	$900,000	1	$1,500	$45,000
Hand-held radio	9 (70%)	2	200	3,600	2	10	180
CCTV	1 (10%)	1	130,000	130,000	1	6,500	6,500
Lights	8 (60%)	1	200,000	1,600,000	1	10,000	80,000
Fencing	3 (20%)	1	500,000	1,500,000	1	25,000	75,000
Security guards	9 (70%)	1	40,000	360,000	1	40,000	360,000
FSO	13 (100%)	1	75,000	975,000	1	75,000	975,000
Training	13 (100%)	1	3,500	45,500	1	3,500	45,500
FSA	13 (100%)	1	4,000	52,000	1	100	1,300
FSP	13 (100%)	1	4,000	52,000	1	100	1,300
Quarterly drills	13 (100%)	-		-	1	4,000	52,000
Subtotal				*$5,618,100*			*$1,641,780*
Grand total				**$9,147,100**			**$3,340,980**

Example 3 – petroleum facility owner

Company C owns 7 group A and 13 group B petroleum facilities. The estimated costs for this company are presented in Table 63.

Table 63. Example cost for petroleum facility owner

Item	Number (%) estimated to purchase/draft	Initial			Annual		
		Number	Cost/item	Total cost	Number	Cost/item	Total cost
Group A facilities							
Gates	1 (10%)	1	$100,000	$100,000	1	$5,000	$5,000
Security guards	1 (10%)	9	40,000	360,000	9	40,000	360,000
FSO	7 (100%)	1	150,000	1,050,000	1	150,000	1,050,000
Training	7 (100%)	1	5,000	35,000	1	5,000	35,000
FSA	7 (100%)	1	8,000	56,000	1	400	2,800
FSP	7 (100%)	1	8,000	56,000	1	400	2,800
Quarterly drills	7 (100%)	-		-	1	16,000	112,000
Subtotal				*$1,657,000*			*$1,567,600*
Group B facilities							
Coms system	1 (5%)	1	$300,000	$300,000	1	$15,000	$15,000
Gates	1 (10%)	1	100,000	100,000	1	5000	5,000
Hand-held radio	1 (5%)	18	200	3,600	18	10	180
CCTV	1 (5%)	1	130,000	130,000	1	6,500	6,500
Lights	1 (5%)	1	200,000	200,000	1	10,000	10,000
Fencing	1 (5%)	1	500,000	500,000	1	25,000	25,000
Security guards	1 (10%)	3	40,000	120,000	3	40,000	120,000
FSO	13 (100%)	1	37,500	487,500	1	37,500	487,500
Training	13 (100%)	1	3,500	45,500	1	3,500	45,500
FSA	13 (100%)	1	4,000	52,000	1	100	1,300
FSP	13 (100%)	1	4,000	52,000	1	100	1,300
Quarterly drills	13 (100%)	-		-	1	4,000	52,000
Subtotal				*$1,990,600*			*$769,280*
Grand total				**$3,647,600**			**$2,336,880**

Total national cost for facility security

The national cost of the facility security aspects of the ISPS Code is the sum of the individual costs estimated for each facility affected. National cost is discounted to its PV at 7 percent (2003–2012). The total national initial and annual cost is presented in Table 64.

Table 64. Total national PV cost for facility security, in $millions (2003-2012, 7 percent discount rate)

Year	Container, break-bulk	Dry bulk	Haz. bulk liquid	Haz. sub other	Other bulk liquid	Ferry	Other passenger	Total	PV Total
2003 (initial)	$70	$116	$478	$90	$37	$153	$19	$963	$963
2004 (annual)	48	42	300	55	19	59	12	535	500
2005 (annual)	48	42	300	55	19	59	12	535	467
2006 (annual)	48	42	300	55	19	59	12	535	437
2007 (annual)	48	42	300	55	19	59	12	535	408
2008 (annual)	48	42	300	55	19	59	12	535	381
2009 (annual)	48	42	300	55	19	59	12	535	356
2010 (annual)	48	42	300	55	19	59	12	535	333
2011 (annual)	48	42	300	55	19	59	12	535	311
2012 (annual)	48	42	300	55	19	59	12	535	291
Total	**$502**	**$494**	**$3,178**	**$585**	**$208**	**$684**	**$127**	**$5,778**	**$4,447**

Table 65 presents the national cost for different elements of implementing the ISPS Code for facilities (these costs are not discounted).

Table 65. Total national initial and annual cost by element of compliance, in $millions

Element	Initial cost	Percent of total	Annual cost	Percent of total
FSA	$23	2%	$1	0%
FSP	23	2%	1	0%
FSO	335	35%	335	63%
Training	17	2%	17	3%
Drilling	0	0%	35	7%
Security guards	124	13%	124	23%
Equipment	441	46%	22	4%
Total	$963	100%	$509	100%

As shown, upgrading/installing equipment is the driving costs of implementing the ISPS Code initially. Annually, FSOs are the driving cost. In the initial year, FSOs account for approximately 35 percent of the initial cost and increase in significance to 66 percent annually.

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Port security

Summary

Note: for definition of acronyms throughout this analysis, refer to the list at the beginning of the report.

Implementing the ISPS Code and NVICs could affect stakeholders in 47 COTP AORs containing 361 ports.[3] The following analysis details preliminary costs to public and private stakeholders and does not include costs to the Coast Guard.

The preliminary cost estimate of implementing ISPS Code as it pertains to port security is PV $477 million (2003–2012, 7 percent discount rate). The initial cost of the startup period (June 2003–December 2003) for establishing PSCs and creating PSPs in all AORs is estimated to be $120 million (non-discounted). Following the startup period, the first year of implementation (2004), consisting of monthly PSC meetings and PSP drill exercises for all AORs, is estimated to be $106 million (non-discounted). After the first year of implementation, the annual cost of quarterly PSC meetings and PSP drills for all AORs is estimated to be $46 million (non-discounted). The startup period cost associated with creating PSCs and PSPs for each AOR is the primary cost driver of implementing the ISPS Code at U.S. ports. Both the startup and implementation year period (2003–2004) combined is nearly half of the total 10-year PV cost estimate, making initial development, planning, and testing the primary costs of port security.

Implementing the ISPS Code and complying with NVICs would require all COTPs to develop security committees, plans, and training drills for their AORs, with the participation of maritime transportation stakeholders in their AORs. The above costs to stakeholders would be paperwork, travel, and communication costs associated with participation in PSP implementation.

We estimate 1,090,400 hours of paperwork and other associated planning activities during 2003, the initial period of port security meetings and development. In 2004, the first year of implementation, we estimate the value will rise slightly to 1,278,400 hours of paperwork and other related information and communication activities related to monthly PSC meetings. In subsequent years, we estimate the hours will fall to 827,200 hours annually associated with PSC meetings, PSP revisions, and information drills.

Analysis

Period of analysis

The period of analysis is from mid 2003 (the startup year) to 2012 (approximately 10 years). The port security aspects would be effective in 2004, so we assume the last 6 months in 2003 of the project to be a startup period of establishing PSCs and creating PSPs for all COTP AORs. We assume, therefore, that initial costs will be incurred in 2003, and annual costs will be incurred each year 2004–2012.

Population affected

Implementing the ISPS Code would affect stakeholders nationally in 47 COTP AORs containing 361 total ports. The Army Corps of Engineers Navigation Data Center and MARAD provided the data for total ports affected. For this analysis, "ports" include all areas located within or adjacent to a marine environment through which maritime commerce is conducted or people are transported. Consistent with NVIC 9-02, *Guidelines for Port Security Committees and Port Security Plans Required for U.S. Ports*, and parts A and B of the ISPS Code, PSPs will be developed by PSCs headed by COTPs. COTPs also determine the

[3] The ISPS Code provides requirements for "Port Facilities." The Coast Guard, however, differentiates between ports and facilities in domestic regulations. As a result, for the purposes of this cost analysis, the terms PFSC and PFSP have been replaced with PSC and PSP for the port security section.

size and composition of the PSCs. The affected population per COTP AOR is assumed to be stakeholders who participate in the PSC, planning, and drilling. A stakeholder is considered to be any business, organization, (non-Federal) government entity, or individual involved with maritime commerce in a given port area.

We believe the composition and number of stakeholders will vary greatly from AOR to AOR and will be determined by the commercial scope of the ports in each AOR. For the purpose of estimating average costs, we assumed the average level of meeting, planning, and drilling participation to be 200 stakeholders per AOR, based on discussions with COTPs and estimates of average U.S. facility and vessel presence per port. We understand that some AORs may have higher participation levels and other AORs have very lower participation levels; however, we believe this to be a reasonable national estimate of stakeholder participation per AOR.

Unit cost assumptions

The port security implementation cost per stakeholder is expected to be small in comparison to facility and vessel security implementation. Stakeholders are not required to purchase or upgrade materials or services, as in the implementation of the ISPS Code for facilities or vessels. Some companies and facilities are required to have CSOs and FSOs (as detailed in the vessel and facility security sections) attend at least one of the quarterly PSC meetings a year; however, we expect few stakeholders to fully participate in all of the implementation or annual activities for a given COTP AOR. Finally, most stakeholders in large to medium-sized ports have already completed or adopted appropriate and transferable PSPs before the ISPS Code will become effective.

All costs for ISPS Code implementation for port security are related to personnel. Stakeholder hourly costs are assumed to be $100 per burden hour for managerial personnel and $35 per burden hour for administrative/clerical personnel. These costs are "loaded" wage rates, which means they include benefits, local travel, and other overhead costs. These rates are based on BLS data and previous Coast Guard analyses that estimated meeting and planning costs. While some employees cost more than this and some cost less, we believe these estimates for the two labor types are reasonable average costs of the employees that would conduct this work.

The stakeholder costs are divided into three hourly activities: PSC meetings, PSP development, and drilling, which include tabletop management drills and administrative drills. PSC meetings are estimated to consume an average of 6 hours for office preparation and meeting time, plus 2 hours of travel time. PSC meetings are monthly for the first 18 months and quarterly thereafter. Initial PSP development and planning is estimated to be a maximum of 80 hours (2 weeks) of non-PSC meeting time in 2003. PSP administrative and management drills are information and communication exercises that will take place at the stakeholder site. Administrative drills will occur twice a year for 2 hours to update company and facility contact information. Management drills will occur four times a year for 4 hours to exercise PSP information and communication readiness. These activities collectively involve meetings, planning coordination, and communication drills that are information-gathering events. Costs to stakeholders, therefore, are determined by the labor rates and the number of hours each type of labor will be involved in each activity.

The frequency of the PSC meeting activity, estimated hours, and unit cost per stakeholder at a full participation level is presented in Table 66, and the frequency of the PSP planning and drill activities, estimated hours, and unit cost per stakeholder at a full participation level is presented in Table 67.

Table 66. PSC meeting frequency, hours, and unit cost per stakeholder

Stakeholder meeting	Hours per meeting	Frequency[1]	Cost per hour	Initial: Total hours per stakeholder	Initial: Total cost per stakeholder	Annual: Total hours per stakeholder	Annual: Total cost per stakeholder
Startup PSC meetings							
2003	8	1/month	$100	48	$4,800	-	$ -
Annual PSC meetings							
2004	8	1/month	$100	-	-	96	$9,600
2005–2012	8	4/year	$100	-	-	28	$2,800

[1] Startup meetings (July-December 2003) consist of monthly planning meetings; the first year of implementation beginning 2004 consists of 12 monthly meetings; meetings for future years will be quarterly.

Table 67. PSP planning and drill frequency, hours, and unit cost per stakeholder

Stakeholder activity	Hours per activity	Frequency	Cost per hour	Initial: Total hours per stakeholder	Initial: Total cost per stakeholder	Annual: Total hours per stakeholder	Annual: Total cost per stakeholder
PSP Planning							
Year 2003	80	1/year	$100	80	$8,000	-	$ -
PSP Drilling (2004–2012)							
Management	4	4/year	100	-	-	16	400
Administrative	2	2/year	35	-	-	4	140

Total national cost for port security

We estimated national cost (both initial and annual) to public and private stakeholders for implementation of the ISPS Code for port security. Each cost is discounted to its PV at 7 percent for years 2003-2012. National cost for port security is presented in Table 68.

Table 68. Total national PV cost for port security, in $millions (2003-2012, 7 percent discount rate)

	PSPs	Meetings	Drills	Total	PV total
2003 (initial)	$75	$45	$ -	$120	$120
2004 (annual)	-	90	16	106	99
2005 (annual)	-	30	16	46	40
2006 (annual)	-	30	16	46	38
2007 (annual)	-	30	16	46	35
2008 (annual)	-	30	16	46	33
2009 (annual)	-	30	16	46	31
2010 (annual)	-	30	16	46	29
2011 (annual)	-	30	16	46	27
2012 (annual)	-	30	16	46	25
Total cost ($m)	**$75**	**$375**	**$144**	**$594**	**$477**

As shown, the initial cost associated with creating a PSP and holding development PSC meetings for each AOR is the primary cost driver for implementing the ISPS Code at U.S. ports. In addition, both the startup and implementation year periods (2003–2004) combined are nearly half of the total 10-year PV cost, making initial development and planning the primary costs to port security. These estimates are conservative because most COTP AORs have already done some security planning and organization. Furthermore, the level of stakeholder participation may not be as high as 200 per COTP AOR, and stakeholders will not be required to participate in all of the port security activities and drills in a given year.